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Bacteriology  
Biochemistry  
Food Research

 **University of Idaho**  
Department of Bacteriology  
& Biochemistry  
Moscow, Idaho 83843  
(208) 885-7966

Mr. David Eaton  
Beker Industries Corporation  
P.O. Box 37  
Conda, ID 83230

October 4, 1985

Dear Mr. Eaton:

Enclosed are copies of the report of the 1985 study of fluoride levels of vegetation samples collected in the Soda Springs area. You will note that the fluoride levels of the vegetation are the lowest they have been for several years. Let me know if additional copies of the report are needed.

I have arranged with Sarah Henson, Agricultural Agent in Caribou County, to discuss the 1985 study at a meeting on November 19, at 10:00 AM in the conference room of the courthouse. Additional copies of the report will be available at this meeting.

It would be appreciated if you will send the \$1,100.00, your share of the \$2,200.00 balance due for conducting this study.

I will be away from Moscow from October 17 to November 11. If you have any questions regarding the study contact me before October 17.

Very truly yours,



A.C. Wiese, Professor Emeritus  
Department of Bacteriology  
and Biochemistry

ACW/kp  
Enclosure

# **FLUORINE STUDIES in the SODA SPRINGS AREA 1985**

Department of Bacteriology and Biochemistry



University of Idaho

College of Agriculture

September 1985

During the summer of 1985 a study, similar to those made from 1956 through 1984, was conducted to measure the fluoride content of vegetation grown in the vicinity of manufacturing plants located near Soda Springs and Conda. These plants process phosphate ore to produce elemental phosphorus (Monsanto) and phosphate fertilizer (Baker). A survey study was not conducted in 1964. The El Paso phosphate fertilizer plant located near Conda, which began operations in the latter part of 1965, terminated operations in September 1967. This plant was sold to the Baker Industries Corporation and during the summer of 1972 began operations for the production of phosphate fertilizers.

Other industries near Soda Springs use certain by-products from the production of elemental phosphorus. Vanadium is recovered from the heavy slag (ferro-phos) by the Kerr McGee plant. The calcium silicate type slag, which contains approximately 75 percent of the fluoride originally present in the phosphate ore, is used as fill material, road beds and the production of asphalt paving (black top). Vegetation contaminated with this slag will have elevated fluoride levels.

Samples of vegetation were collected at two different times during the summer; the first sampling was June 25, and the second August 15. The locations at which the samples were taken and the area covered in this study are shown on the attached map (Fig. 1). As far as possible, samples were collected from the same locations as during the 1984 studies. Table I gives a description and location of the samples collected. In general, the sample numbers correspond to those used in the 1984 report.

The procedures used for collecting, preparing and analyzing the samples, with one exception, were the same as those used in previous studies (1,2). In 1985 the samples were collected by D.P. Wind of the Monsanto Company and David

Eaton of Beker Industries Corporation. The samples were then sent to Dr. A.C. Wiese, Department of Bacteriology and Biochemistry, University of Idaho, for processing and analysis.

The fluoride content of the vegetation samples collected, expressed as parts per million (ppm.) on the dry weight basis, is given in Table 2. The data shows that the average fluoride content of the June 1985 samples was 17 ppm. compared to 22 ppm. for the June 1984 samples. The fluoride level for the June 1985 samples is similar to that found for the June 1980, 1982 and 1983 samples.

There was a very small increase in the fluoride level of the August 1985 samples. The average fluoride content of the August 1985 samples was 19 ppm. compared to 30 ppm. found in the August 1984 samples. The fluoride level of the vegetation samples collected in August 1985 was the lowest it has been for several years.

Figure 2 shows the average fluoride level of the vegetation samples from 1975 through 1984. These data show the wide variation in the fluoride level that occurred during this period. From this data, it can be seen that the fluoride levels in 1985 were lower than in 1984. The data also shows that the fluoride level of the August 1985 samples were the lowest in the past ten years. The low fluoride level found in 1976 was because the Beker Company plant did not operate from June 1 to October 1, 1976.

The Idaho Air Pollution Control Commission (3) sets a standard that the yearly average fluorine content of vegetation used for livestock feeding should not exceed 40 parts per million on the dry weight basis. Publications by the National Academy of Sciences (4, 5) state that 40 ppm. is probably a safe level. The data in Table 3 compares the number of samples containing 40 or more parts per million of fluorine for the years 1966 through 1985. The 1985 data shows

that none of the samples collected in June and 7 percent of the samples collected in August had a fluoride content greater than 40 ppm.

Literature Cited:

1. Fluoride Studies in the Soda Springs Area. Reports issued 1956 to 1971 by the Department of Agricultural Biochemistry and Soils, University of Idaho.
2. Fluorine Studies in the Soda Springs Area - 1972 to 1984. Department of Bacteriology and Biochemistry, University of Idaho.
3. Rules and Regulations for the Control of Air Pollution in Idaho. Idaho Air Pollution Control Commission. January 1969. (Revised October 1972).
4. Fluorides. National Academy of Sciences. 1971.
5. Effects of Fluorides in Animals. National Academy of Sciences 1974.

Personnel:

A. C. Wiese

Acknowledgement:

This study was financed by funds provided by the Monsanto Company and Beker Industries Corporation.

Table 1. Soda Springs, 1985 Sample Description

SS - 1	Alfalfa	2.3 miles SE of Monsanto
SS - 2	Alfalfa	2.8 miles SE of Monsanto
SS - 3	Alfalfa	1.9 miles ENE of Monsanto (B. Panting)
SS - 4	Alfalfa	2.1 miles ENE of Monsanto (B. Panting)
SS - 5	Alfalfa	2.6 miles NE of Monsanto (Maughm)
SS - 9	Alfalfa	9.5 miles NE of Monsanto (Dredges)
SS - 10	Alfalfa	9.2 miles NE of Monsanto (Dredges)
SS - 11	Grass	5.9 miles NE of Monsanto (Torgerson)
SS - 13	Alfalfa	4.6 miles NNE of Monsanto (Torgerson)
SS - 16	Grass	4.7 miles N of Monsanto (Butterfield)
SS - 17	Alfalfa	4.5 miles N of Monsanto (Butterfield)
SS - 18	Alfalfa	4.5 miles N of Monsanto (Butterfield)
SS - 19	Alfalfa	4.6 miles NW of Monsanto (Bybee)
SS - 20	Alfalfa	5.1 miles NW of Monsanto (Bybee)
SS - 21	Grass	4.1 miles NNW of Monsanto (Butterfield)
SS - 22	Grass	3.7 miles NNW of Monsanto (Lau)
SS - 23	Grass	3.9 miles N of Monsanto (Butterfield)
SS - 24	Grass	2.9 miles N of Monsanto (Lau)
SS - 25	Grass	1.8 miles W of Monsanto (Cellam)
SS - 26	Grass	0.7 miles W of Monsanto (Cellam)
SS - 31	Alfalfa	1.0 miles SW of Monsanto (Kackley)
SS - 32	Alfalfa	0.8 miles SW of Monsanto (Kackley)
SS - 33	Alfalfa	1.2 miles SW of Monsanto (Kackley)

Table 1 (cont.)

SS - 34	Alfalfa	1.4 miles SW of Monsanto (Kackley)
SS - 35	Alfalfa	2.6 miles S of Monsanto
SS - 36	Sainfoin	2.8 miles SW of Monsanto
SS - 38	Alfalfa	4.0 miles SW of Monsanto
SS - 42	Grass	0.7 miles SE of Monsanto (Kackley)
SS - 43	Grass	6.2 miles NE of Monsanto
SS - 44	Grass	3.2 miles NW of Monsanto

Table 2. Fluoride Content of Vegetation Samples Collected from the Soda Springs Area in 1985 Expressed in Parts Per Million on the Dry Weight Basis.

Distance from Monsanto	Sample Number	Vegetation	Sampling First	Period Second
0-1 mile	SS - 26	Grass	12	26
	SS - 32	Alfalfa	31	32
	SS - 42	Grass	19	NA
1-2 miles	SS - 3	Alfalfa	16	16
	SS - 25	Grass	13	14
	SS - 31	Alfalfa	19	10
	SS - 33	Alfalfa	NA	12
	SS - 34	Alfalfa	16	12
2-3 miles	SS - 1	Alfalfa	19	13
	SS - 2	Alfalfa	17	13
	SS - 4	Alfalfa	18	18
	SS - 5	Alfalfa	21	34
	SS - 24	Grass	25	31
	SS - 35	Alfalfa	17	18
3-4 miles	SS - 36	Sainfoin	11	10
	SS - 22	Grass	16	40
	SS - 23	Grass	14	21
	SS - 38	Alfalfa	14	11
4-5 miles	SS - 44	Grass	16	NA
	SS - 13	Alfalfa	22	25
	SS - 16	Grass	15	19
	SS - 17	Alfalfa	12	16
	SS - 18	Alfalfa	13	19
	SS - 19	Alfalfa	11	13
Over 5 miles	SS - 21	Grass	12	22
	SS - 9	Alfalfa	13	15
	SS - 10	Alfalfa	12	12
	SS - 11	Grass	33	65
	SS - 20	Alfalfa	11	15
	SS - 43	Grass	17	31

NA - Sample unavailable during sampling period

Sampling Dates: First: June 25, 1985

Second: August 14, 1985



Table 3. Percent of Samples Containing 40 PPM or More of Fluoride

Date	Total No. of Samples	No. 40 ppm F. or over	% 40 ppm F or over
1966			
First; 6/17-6/20	28	8	29
Second; 7/21	13	7	54
Third; 8/25	14	10	71
1967			
First; 6/17-6/28	34	5	15
Second; 8/8	24	9	38
Third; 8/26	10	7	70
1968			
First; 6/10	27	7	26
Second; 8/8	19	6	32
Third; 8/26	19	5	21
1969			
First; 6/23	42	6	14
Second; 7/20	34	19	56
Third; 8/22	33	17	52
1970			
First; 6/22	41	8	20
Third; 8/24	29	15	52
1971			
First; 6/19	38	1	3
Second; 7/22	20	1	5
Third; 8/19	26	4	15
1972			
First; 6/19	38	1	3
Second; 7/21	14	1	7
Third; 8/16	32	3	9
1973			
First; 6/26	38	4	11
Second; 8/13	35	6	17
1974			
First; 6/26	40	6	15
Second; 8/21	35	12	34

Table 3 (cont.)

1975				
First;	7/1	36	2	6
Second;	8/19	30	11	37
1976				
First;	6/14	40	0	0
Second;	8/11	35	3	9
1977				
First;	6/29	40	4	10
Second;	8/10	34	6	18
1978				
First;	6/27	41	12	29
Second;	8/15	34	9	12
1979				
First;	6/26	38	9	24
Second;	8/21	27	11	41
1980				
First;	6/25	39	0	0
Second;	8/19	36	5	14
1981				
First;	6/30	39	8	21
Second;	8/10	29	11	38
1982				
First;	6/30	39	0	0
Second;	8/19	36	9	25
1983				
First;	6/28	40	2	5
Second;	8/17	37	2	6
1984				
First;	7/2	35	2	6
Second;	8/16	30	5	17
1985				
First;	6/25	29	0	0
Second;	8/14	30	2	7

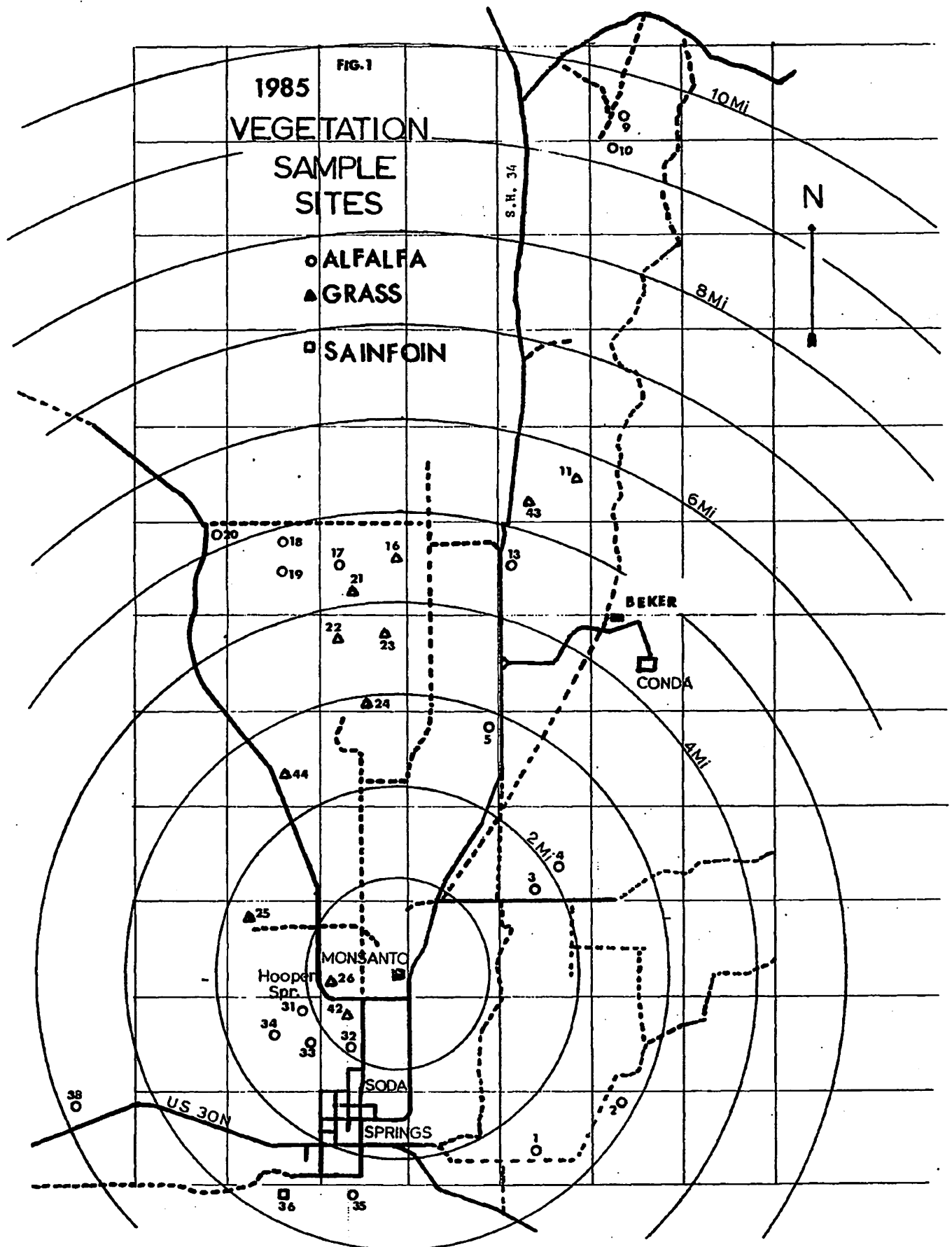


Figure 2. Average Fluoride Levels of Vegetation Samples from the Soda Springs Area

